Physics S1

Newtonian Physics

Physics S2

Electromagetic Spectra

Every day <u>each</u> group will need:

- **One physics textbook**
- **One computer**

Each activity includes:

- WDYS
- WDYT
- Investigate
- Physics Talk
- WDYTN
- Checking up
- Physics to Go

Chapter 5: Let Us Entertain You

04/04/16

Chapter Challenge (p. 480)

2-4 min	0-30/0, 30-60/20, 60-90/15, 90-120/20		30
Sound	2+	10 pts ea	20
Light	2+	10 pts ea	20
Entertaining	(1-5 scale)		20
Explain Physics Principals		10 pts ea	40
			130

5.1 Sounds in Vibrating Strings (p. 484) 04/04/16

WDYS: I see two kids making instruments with household items. Using a string and an empty can. They also have a weight on one end of the string. There is a drink spilled on the floor. The boys hair got blown back. The dog is playing some kind of instrument, he also has a music stand. I see a dog playing a one string guitar looking instrument, a person who looks in surprise with their hair pushing back by something coming from a string tied down with a cup underneath, that is being strung by a girl.

WDYT: Guitarists and violinists make different sounds by the tightness of the strings on the instruments.
If someone were pretending to play air guitar, to make higher pitch notes they would position their fingers closer to where the edge of the guitar would be.
guitarists and violinists make different sounds by tightening the strings or loosening the strings of their instrument.
You would place their fingers closest to the top

5.1 Sounds in Vibrating Strings (p. 484)

04/04/16

IWBAT

- determine the effect of string length on the pitch of the sound produced
- determine the effect of tension on the pitch of the sound produced
- summarize experimental results.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

5.1 Sounds in Vibrating Strings (p. 484)

Investigate:
Follow ALL safety precautions.

IWBAT determine the effect of string length on the pitch of the sound produced, determine the effect of tension on the pitch of the sound produced, and summarize experimental results.

5.1 Sounds in Vibrating Strings (p. 484)

Physics Talk (p. 486)

To produce sound, something must vibrate

Length + tension affect the pitch

pitch increases when length decreases and/or tension increases

pitch decreases when length increases and/or tension decreases

IWBAT determine the effect of string length on the pitch of the sound produced, determine the effect of tension on the pitch of the sound produced, and summarize experimental results.

5.1 Sounds in Vibrating Strings (p. 484)

Checking Up (p. 487) # 1-4

What Do You Think Now? (p. 489) In complete sentences

Physics to Go (p. 490) # 1-4, 6-8

IWBAT determine the effect of string length on the pitch of the sound produced, determine the effect of tension on the pitch of the sound produced, and summarize experimental results.

5.2 Making Waves (p. 492)

04/06/16

WDYS:

WDYT:

IWBAT

- calculate the speed of a wave pulse
- investigate the relationship among wave speed, wavelength, and frequency
- make a model of wave motion
- distinguish between transverse and longitudinal waves.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

5.2 Making Waves (p. 492)

Investigate (p. 492)

Be careful to not overstretch the slinky.

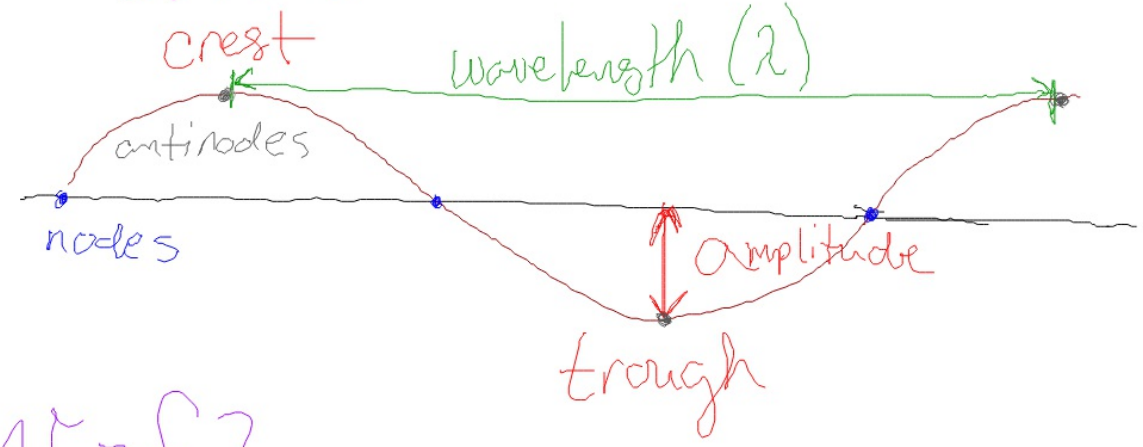
IWBAT calculate the speed of a wave pulse, investigate the relationship among wave speed, wavelength, and frequency, make a model of wave motion, and distinguish between transverse and longitudinal waves.

5.2 Making Waves (p. 492)

Physics Talk (pp. 498-502)

Light is a transverse wave that requires no medium

wave – a transfer of energy w/ no net transfer of mass



$f = \frac{\text{waves}}{\text{sec}} = \frac{1}{T}$

$f\,(Hz)$ or $\left(\frac{1}{s}\right)$ or (s^{-1})

$T = \frac{1}{f}\ T\,(s)$

$v = f\lambda$

$\left(\frac{m}{s}\right) = \left(\frac{1}{s}\right)(m)$

IWBAT calculate the speed of a wave pulse, investigate the relationship among wave speed, wavelength, and frequency, make a model of wave motion, and distinguish between transverse and longitudinal waves.

5.2 Making Waves (p. 492)

Checking Up (p. 502) # 1-3

WDYTN (p. 504) In complete sentences

Physics to Go (p. 505) # 1-6, 10-14

IWBAT calculate the speed of a wave pulse, investigate the relationship among wave speed, wavelength, and frequency, make a model of wave motion, and distinguish between transverse and longitudinal waves.

5.3 Sounds in Strings Revisited (p. 508)

04/15/16

WDYS:

WDYT:

5.3 Sounds in Strings Revisited (p. 508) 04/15/16

IWBAT

- calculate the wavelength of a standing wave on a string
- describe how the pitch of the sound produced by a vibrating string depends on the wave speed, wavelength, and frequency of the waves on the string.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

5.3 Sounds in Strings Revisited (p. 508)

Investigate

Follow all safety procedures.

This procedure should take about 30 min .

$$v = f\lambda$$

$$v_{\text{velocity}} = f_{\text{frequency}} \cdot \text{wavelength } (\lambda)$$

$$(m/s) \qquad (1/s) \qquad (m)$$

IWBAT calculate the wavelength of a standing wave on a string, and describe how the pitch of the sound produced by a vibrating string depends on the wave speed, wavelength, and frequency of the waves on the string.

5.3 Sounds in Strings Revisited (p. 508)

Physics Talk (p. 510)

String is always ½ of the wavelength.

$v = f\lambda$ Inverse Relationship:

$f = \frac{v}{\lambda}$ $f \propto \frac{1}{\lambda}$

Speed of the wave increased

Direct Relationship: $f \propto v$

IWBAT calculate the wavelength of a standing wave on a string, and describe how the pitch of the sound produced by a vibrating string depends on the wave speed, wavelength, and frequency of the waves on the string.

5.3 Sounds in Strings Revisited (p. 508)

The thicker string will move more slowly for a given tension or force

Equation explains why an increased mass accelerates more slowly

L = length of string, n = number of antinodes in standing wave

$L = \frac{n\lambda}{2}$ $\quad 2L = n\lambda$ $\quad \frac{2L}{n} = \lambda$ $\quad f = \frac{1}{T}$

$v = f\lambda$ $\quad \lambda = \frac{v}{f}$ $\quad f = \frac{v}{\lambda}$

IWBAT calculate the wavelength of a standing wave on a string, and describe how the pitch of the sound produced by a vibrating string depends on the wave speed, wavelength, and frequency of the waves on the string.

5.3 Sounds in Strings Revisited (p. 508)

Checking Up (p. 514) # 1-4

WDYTN (p.) In complete sentences

Physics to Go (p. 517) # 1, 2, 3, 5, & 7

IWBAT calculate the wavelength of a standing wave on a string, and describe how the pitch of the sound produced by a vibrating string depends on the wave speed, wavelength, and frequency of the waves on the string.

5.4 Sounds from Vibrating Air (p. 518) 04/20/16

WDYS:

WDYT:

5.4 Sounds from Vibrating Air (p. 518) 04/20/16

IWBAT

- identify standing waves in different kinds of air-filled tubes
- observe how pitch changes with the length of the tube
- observe the effect of closing one end of the tube on the pitch of the sound
- observe sound bending around corners and spreading
- relate observations of pitch to drawings of standing waves
- summarize experimental results
- organize observations to find a pattern.

Via

- Participating in collaborative experiments
- Team and whole class discussions to clarify key concepts
- Collaboratively answering questions targeting key concepts

5.4 Sounds from Vibrating Air (p. 518)

Investigate

Please exercise caution when working with the glass test tubes.

Do:
Parts A & B
Part C if time remains today.

IWBAT identify standing waves in different kinds of air-filled tubes, observe how pitch changes with the length of the tube, observe the effect of closing one end of the tube on the pitch of the sound, observe sound bending around corners and spreading, relate observations of pitch to drawings of standing waves, summarize experimental results, and organize observations to find a pattern.

5.4 Sounds from Vibrating Air (p. 518)

Physics Talk (p. 521)

Sound is Compressional (longitudinal) wave

The bottom of the test tube node

opening of testtube

Antinode

No displacement at the bottom of the test tube

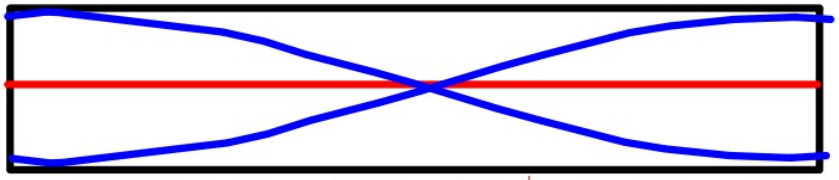
Diffraction:

Sound waves spread out or change direction as they emerge from an opening

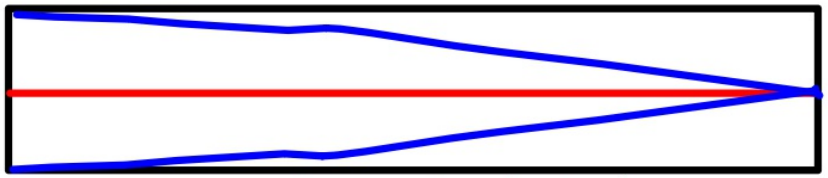
IWBAT identify standing waves in different kinds of air-filled tubes, observe how pitch changes with the length of the tube, observe the effect of closing one end of the tube on the pitch of the sound, observe sound bending around corners and spreading, relate observations of pitch to drawings of standing waves, summarize experimental results, and organize observations to find a pattern.

5.4 Sounds from Vibrating Air (p. 518)

The opening compared to the wave length determins the amount of diffraction.



open ended tube $\lambda = 2L$



Closed ended tube $\lambda = 4L$

IWBAT identify standing waves in different kinds of air-filled tubes, observe how pitch changes with the length of the tube, observe the effect of closing one end of the tube on the pitch of the sound, observe sound bending around corners and spreading, relate observations of pitch to drawings of standing waves, summarize experimental results, and organize observations to find a pattern.

5.4 Sounds from Vibrating Air (p. 518)

Checking Up (p. 523) # 1-3

WDYTN (p.) In complete sentences

Physics to Go (p. 526) # 1, 2, 3, 4, & 8

skip 3b's drawing

IWBAT identify standing waves in different kinds of air-filled tubes, observe how pitch changes with the length of the tube, observe the effect of closing one end of the tube on the pitch of the sound, observe sound bending around corners and spreading, relate observations of pitch to drawings of standing waves, summarize experimental results, and organize observations to find a pattern.